

## A new species of *Hakea* (Proteaceae) from the Swan Coastal Plain, Western Australia

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### Abstract

Shepherd, K.A. & Barker, R.M. A new species of *Hakea* (Proteaceae) from the Swan Coastal Plain, Western Australia. *Nuytsia* 19(2): 253–258 (2009). *Hakea oligoneura* K.A.Sheph. & R.M.Barker, a new species described herein, is only known from a few populations less than 100 km from the Perth metropolitan area. A distribution map and images of this new species are included.

### Introduction

*Hakea* Schrad. & J.C.Wendl. is one of the largest endemic genera in Australia with around 150 species currently recognised. Even though this genus was revised a decade ago for the *Flora of Australia* (Barker *et al.* 1999), new species are still being discovered and described, some of which occur in close proximity to urban regions. One such example is the recently described *Hakea chromatropa* A.S.George & R.M.Barker (George & Barker 2007), which occurs less than 150 km from the Perth metropolitan area in Western Australia. It was only recognised as being distinct from *H. ilicifolia* R.Br. when flowering specimens were obtained for the first time in 2006.

This recent discovery highlights the value of ongoing botanical survey effort even in relatively densely populated areas such as the Swan Coastal Plain. Another poorly known taxon, found on coastal limestone in the Yalgorup National Park less than 100 km south of the Perth, is described here. This taxon was initially informally named '*Hakea undulata* limestone variant (B. Keighery & N. Gibson 237)' and was later given the phrase name *Hakea* sp. Yalgorup (B.J. Keighery & N. Gibson 897). As it was only known from a few populations in a National Park it was given a Priority Four Conservation Status by the Department of Environment and Conservation. Despite this taxon being recognised as potentially new for more than 10 years, a lack of adequate material hindered the clarification of its status. Further collections by K.A. Shepherd and N. Gibson were made in September 2008 and it is apparent that while this taxon is allied to *H. anadenia* Haegi and *H. undulata* R.Br. it is readily distinguished by a number of vegetative and floral characters.

## Methods

Characters were measured from specimens lodged at the Western Australian Herbarium (PERTH). Floral measurements were made using spirit material preserved in 70% ethanol and herbarium sheet material rehydrated in hot water with a small amount of detergent. Terminology for characters follows that of Barker *et al.* (1999) with the exception of the perianth measurements, which were made on open flowers rather than mature buds. This species has a Department of Environment and Conservation Priority listing. Accordingly, exact localities of known populations have been withheld. The distribution map was created using DIVA-GIS Version 5.2.0.2 and show IBRA Version 6.1 regions (Department of the Environment, Water, Heritage and the Arts 2008).

### Revised *Flora of Australia* key to species of *Hakea* (Barker *et al.* 1999: 31–170)

For *Hakea oligoneura*, the *Undulata* Group should be amended at Couplet 1 (p. 125) as follows:

- 1 Leaf margin spinulose-dentate, some leaves rarely entire
- 1a Leaves without visible secondary venation, with (0–)1–5 mucros per margin;  
fruit 1.1–1.8 cm long, 0.55–1.15 cm wide (Yalgorup National Park, W.A.;  
flowers August–September).....**H. oligoneura**
- 1a: Leaves with with prominent secondary venation, (2–)5–10 mucros per margin,  
fruit 1.7–3 cm long, 0.8–1.4 cm wide
- 2 Erect shrub; leaves 20–65 mm wide, longitudinal veins 3–7; flowers cream-white;  
pistil 3–4 mm long; fruit 2.3–3 cm long, 1–1.4 cm wide, often more than 3 per axil  
(Darling Range to Albany, W.A.; flowers July–October)..... **H. undulata**
- 2: Bushy shrub; leaves 6–20 mm wide, longitudinal veins 1–3; flowers white to pink;  
pistil 4–6 mm long; fruit 1.7–2.3 cm long, 0.8–1.1 cm wide, never more than 3  
per axil (Eneabba to Moore River area and Pingelly/Narrogin area, W.A.;  
flowers July–October) ..... **H. anadenia**

## Taxonomy

***Hakea oligoneura*** K.A.Sheph. & R.M.Barker *sp. nov.*

Ab *Hakea anadenia* Haegi and *Hakea undulata* R.Br. marginibus foliorum leniter undulatis, mucronibus paucis sine nervis secundariis, et pistillo brevioris statim diagnoscenda.

*Typus*: Yalgorup National Park, Western Australia [precise locality withheld for conservation purposes], 17 September 2008, K.A. Shepherd & N. Gibson KS 1124 (*holo*: PERTH 07909225; *iso*: AD, CANB).

*Hakea* sp. Yalgorup (B.J. Keighery & N. Gibson 897), Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed 1 May 2009].

*Hakea undulata* limestone variant (B. Keighery & N. Gibson 237), Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed 1 May 2009].

*Shrubs* 1.8–2 m high and up to 2 m wide. *Bark* smooth or finely fissured. *Branchlets* terete with dense, adpressed, ferruginous or white, simple hairs 0.2–0.4 mm long, glabrescent. *Leaves* alternate, narrowly elliptic to oblanceolate, flat or rarely shallowly concave, 21–68 mm long, 4.5–10 mm wide, narrowly attenuate towards the base, spinose-dentate, with (0–)1–5 mucros per margin, margin straight or shallowly curved between each mucro, rarely entire, apex acute, mucro 0.1–0.5 mm long, glabrous or with infrequent, adpressed hairs 0.1–0.4 mm long; longitudinal veins 1–3(4), prominent above and below, secondary venation obscure. *Inflorescence* axillary, almost sessile; rachis 1–2 mm long, with dense, stiff, white hairs 0.3–0.5 mm long. *Bracts* ovate, strongly concave, 0.5–2.4 mm long, 0.6–1.6 mm wide, with adpressed white hairs 0.1–0.2 mm long, caducous. *Flowers* 6–14. Pedicel 1.2–2.4 mm long, glabrous. *Perianth* 2.5–3.5 mm long, glabrous, white; limb recurved in bud, broadly elliptic, 0.7–1.1 mm long, 0.4–1.1 mm wide; tepals 4 splitting to base after anthesis; anthers 0.4–0.5 mm long, 0.2–0.3 mm wide. *Torus* oblique; gland vestigial, globular, 0.2–0.3 mm long or absent. *Pistil* 2.8–3.6 mm long; pollen presenter conical, 0.4–0.6 mm long; pollen yellow; ovary stipe 0.3–0.6 mm long. *Fruit* almost sessile, down-curved, broadly ovoid, 11–18 mm long, 5.5–11.5 mm wide, beaked, pustulate and ridged, splitting almost to the base. *Seed* along upper side of follicle, obliquely ovate, 8–12 mm long, 4–5 mm wide, black; seed body 2.6–4.4 mm long, 2–2.8 mm wide; wing extending fully or almost fully down both sides of the seed, wider on the upper edge. (Figure 1)

*Other specimens examined.* WESTERN AUSTRALIA: 22 Dec. 2008, *B. Fellows & J. Waud* BCF 56 (PERTH 08008523); 20 Sep. 2003, *P. Foreman* 379 (PERTH 06781276); 20 June 2002, *P. Foreman & J. Kelly* TT 125 (PERTH 06388140); 19 Sep. 1993, *B.J. Keighery & N. Gibson* 896 (PERTH 04305655); 19 Sep. 1993, *B.J. Keighery & N. Gibson* 897 (PERTH 04305639); 19 Sep. 1993, *B.J. Keighery & N. Gibson* 907 (PERTH 04305647); 25 Aug. 1993, *G.J. Keighery* 14992 (PERTH 05041309); 6 Mar. 1994, *G.S. McCutcheon* GSM 2869 (PERTH 06402887); 20 Oct. 1972, *S. Paust* 1422 (PERTH 05496489); 17 Sep. 2008, *K.A. Shepherd & N. Gibson* KS 1125 (PERTH 07909233).

*Distribution and habitat.* Currently only known from a few isolated populations in Yalgorup National Park and Tim's Thicket Reserve. This park is located along the coast between Mandurah and Bunbury in the Swan Coastal Plain (SWA) IBRA region (Department of the Environment and Water Resources 2007) (Figure 2). This species is found growing in white-brown sand on limestone ridges in open Mallee (*Eucalyptus decipiens* and *E. patrensis*) over *Melaleuca acerosa*, *Xanthorrhoea* and *Hibbertia*.

*Phenology.* Flowering specimens have been collected in August and September with fruits forming by late October.

*Conservation status.* As *Hakea oligoneura* is known from a few populations, it currently has a Priority Four – Rare Taxa conservation status under the Conservation Codes for Western Australian Flora (Atkins 2008). This indicates that this species is considered to be rare but not currently under threat from extinction.

*Etymology.* From the Greek *oligo* (few) and *neuron* (nerve) in reference to the lack of obvious secondary venation of the leaves, a feature that distinguishes this species from its closest relatives.

*Affinities.* *Hakea oligoneura* is included in the *Undulata* group (Barker *et al.* 1999) and appears most closely allied to *H. anadenia*. It is readily distinguished from *H. anadenia* by its leaves, which have only (0–)1–5 mucros per margin and the margin is almost straight or only very shallowly curved between each mucro. Furthermore, the leaves have 1–3 longitudinal veins with no obvious secondary venation. *H. oligoneura* also has smaller flowers and a tendency towards smaller fruits (Figure 1). In contrast,



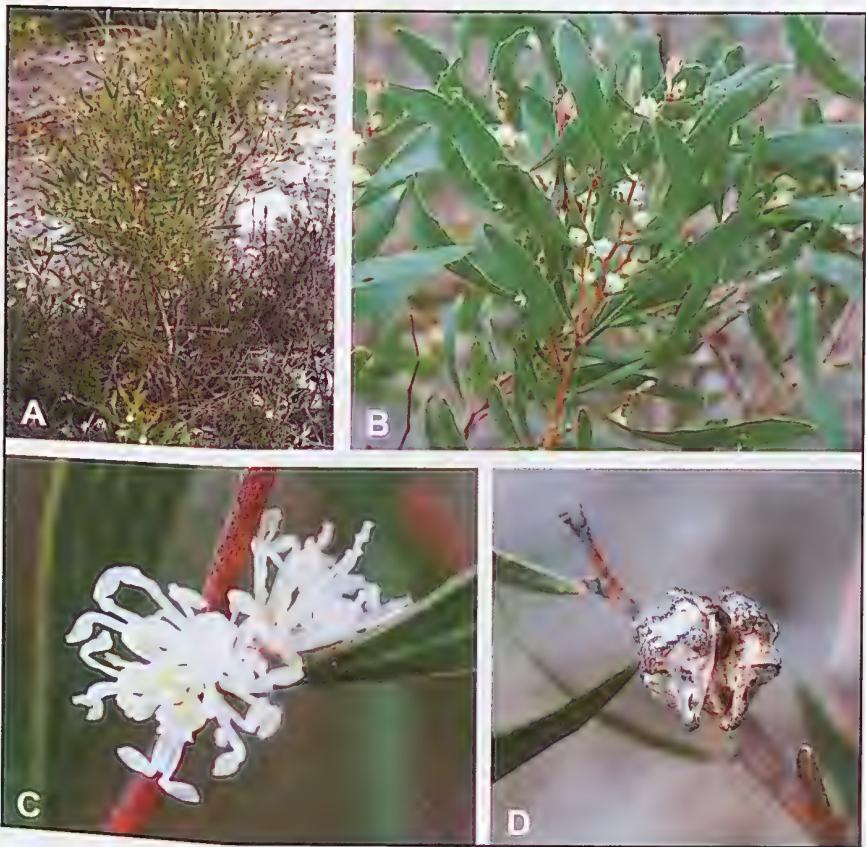


Figure 1. *Hakea oligoneura* (K.A. Shepherd & N. Gibson KS 1124). A – habit; B – flowers and leaves showing the typical longitudinal veins and absence of obvious secondary venation; C – flowers; D – fruit. Photographs by K.A. Shepherd.

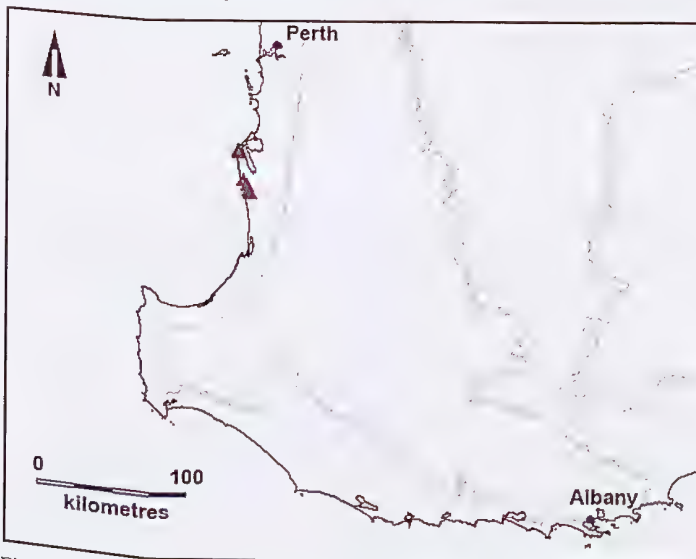


Figure 2. Distribution of *Hakea oligoneura* in the Yalgorup National Park on the Swan Coastal Plain, Western Australia. Version 6.1 IBRA regions shown in grey.

*H. anadenia* has leaves with prominent secondary venation and (2–)5–10 mucros per margin and the margin is more strongly curved between each mucro (Figure 3C). Another related species *H. undulata* (Barker *et al.* 1999), has similar leaves to *H. anadenia* in terms of the mucro number and the obvious secondary venation (although being much broader) and is therefore also easily recognised as distinct from *H. oligoneura* (Figure 3 A, B).

*Hakea oligoneura* is only found on coastal limestone ridges south of Perth, whereas *H. anadenia* occurs on sandy soil from Eneabba to Moore River to the north and inland around Pingelly to Narrogin. Similarly, *H. undulata* occurs on sandy to gravelly soil or clay over granite or laterite from the Darling Range east of Perth to Albany on the south coast.

*Notes.* Two collections (PERTH 06388140 and PERTH 06402887) from Tim's Thicket Reserve north of the type locality of *Hakea oligoneura* have only mature fruits present. The fruits are typical of



Figure 3. *Hakea undulata* (K.A. Shepherd & N. Gibson KS 1112). A – habit showing leaves with obvious secondary venation; B – flowers; *H. anadenia* (J.A. Wege 1528). C – leaves and old flowers. Photographs by K.A. Shepherd (A, B) and J.A. Wege (C).

*H. oligoneura* but the leaves are slightly thicker, yellow-greenish with fewer obvious mucros on the margin and some of the leaves are entire. These plants were collected from a steep limestone hillside that is typical of *H. oligoneura*.

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